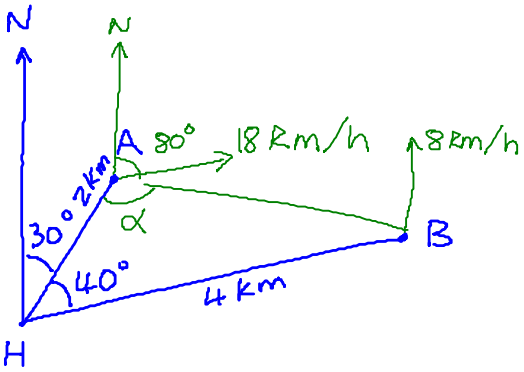
84 Q7

Thursday, 24 September 2009
10:06 AM



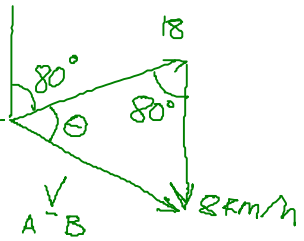
$|\underset{A}{v}_{-B}| = \sqrt{18^2+8^2-2\times18\times8\cos80^\circ}$

$= 18.38 \text{ km/h}$

$\frac{\sin\theta}{8} = \frac{\sin 80^\circ}{18.38}$

$\theta = \sin^{-1}\frac{8\sin80^\circ}{18.38}$

$= 25.37^\circ$



$|\overrightarrow{AB}| = \sqrt{2^2+4^2-2\times4\times2\times\cos40^\circ}$

$= 2.78 \text{ km}$

$\frac{\sin\alpha}{4} = \frac{\sin40}{2.78}$

$\alpha = \sin^{-1}\frac{4\sin40}{2.78}$

$= 67.65^\circ$ ×

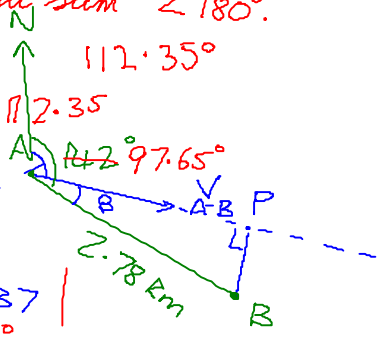
Ambiguous case. It must be the obtuse angle or we get an angle sum < 180°.

$180-67.65 = 112.35^\circ$

Bearing of B from A $= 270 - \cancel{67.65}\ 112.35$

$= \cancel{142.35^\circ}$

97.65°



$\beta = |\cancel{142.35}^{97.65^\circ} - 105.37|$

$= \cancel{36.98}^{\circ}\ 7.72^\circ$

$BP = 2.78\sin\cancel{36.98}\ 7.72^\circ$

$= \cancel{1.67 \text{ km}}\ 0.373 \text{ km}$

$\approx \cancel{1.7 \text{ km}}\ 400 \text{ m}$

8B Q30

$|\underline{a}\cdot\underline{b}| = |\,|a|\,|b|\cos\theta\,|$

$= |a|\,|b|\,|\cos\theta|$

$0 \le |\cos\theta| \le 1$

so $0 \le |a||b||\cos\theta| \le |a||b|$

$\therefore 0 \le |a\cdot b| \le |a||b|$